

WHAT IS CLAIMED IS:

1. A virtual segmentation system, comprising:

a protocol data unit receiver subsystem configured to receive
at least a portion of a protocol data unit and assemble said
protocol data unit; and

a virtual segmentation subsystem, associated with said
protocol data unit receiver subsystem, configured to perform
virtual segmentation on said protocol data unit.

2. The virtual segmentation system as recited in Claim 1
wherein said protocol data unit receiver subsystem further
includes:

an assembler subsystem configured to receive said at least a
portion of said protocol data unit and assemble said protocol data
unit; and

a transmit queue subsystem configured to maintain a linked
list associated with said protocol data unit, perform a function on
said protocol data unit and maintain at least one queue structure
for transmission.

3. The virtual segmentation system as recited in Claim 2 wherein said assembler subsystem is further configured to store said at least a portion of said protocol data unit in at least one block and said transmit queue subsystem is further configured to maintain a linked list of said at least one block.

4. The virtual segmentation system as recited in Claim 1 wherein said virtual segmentation subsystem further includes a stream editor subsystem configured to perform said virtual segmentation.

5. The virtual segmentation system as recited in Claim 4 wherein said stream editor subsystem is further configured to convert between a first protocol and a second protocol.

6. The virtual segmentation system as recited in Claim 4 wherein said stream editor subsystem is further configured to generate a validity check selected from the group consisting of:

a cyclic redundancy check (CRC),

a CRC for asynchronous transfer mode (ATM) adaptive layer 5 (AAL5) over ATM, and

a CRC-10 for operation, administration, maintenance (OAM) cells.

7. The virtual segmentation system as recited in Claim 1
2 wherein said protocol data unit receiver subsystem and said virtual
3 segmentation subsystem are further configured to process a
4 plurality of interleaved portions of different protocol data units.

8. A method of operating a virtual segmentation system,
2 comprising:
3 receiving at least a portion of a protocol data unit;
4 assembling said protocol data unit; and
5 performing virtual segmentation on said protocol data unit.

9. The method as recited in Claim 8 wherein said receiving
2 and said assembling comprises:

3 receiving said at least a portion of said protocol data unit
4 and assembling said protocol data unit with an assembler subsystem;
5 and

6 maintaining a linked list associated with said protocol data
7 unit, performing a function on said protocol data unit and
8 maintaining at least one queue structure for transmission with a
9 transmit queue subsystem.

10. The method as recited in Claim 9 wherein said receiving
2 further comprises storing said at least a portion of said protocol
3 data unit in at least one block and said maintaining said linked
4 list further comprises maintaining a linked list of said at least
5 one block.

11. The method as recited in Claim 8 wherein said virtual
2 segmentation is performed by a stream editor subsystem.

12. The method as recited in Claim 11 wherein said virtual
segmentation further comprises converting between a first protocol
and a second protocol.

13. The method as recited in Claim 11 wherein said virtual
segmentation further comprises generating a validity check selected
from the group consisting of:

- a cyclic redundancy check (CRC),
- a CRC for asynchronous transfer mode (ATM) adaptive layer 5
(AAL5) over ATM, and
- a CRC-10 for operation, administration, maintenance (OAM)
cells.

14. The method as recited in Claim 8 wherein said receiving,
assembling and performing further comprises processing a plurality
of interleaved portions of different protocol data units.

15. A router, comprising:

a physical interface coupled to a first network;

a fabric interface controller coupled to a fabric network;

a fast pattern processor that receives packets of a protocol data unit from said physical interface, performs pattern recognition and classification on said packets and said protocol data unit; and

a routing switch processor that receives said protocol data unit from said fast pattern processor and transmits via said fabric interface controller, said routing switch processor having a virtual segmentation system, including:

a protocol data unit receiver subsystem that receives at least a portion of said protocol data unit and assembles said protocol data unit; and

a virtual segmentation subsystem, associated with said protocol data unit receiver subsystem, that performs virtual segmentation on said protocol data unit.

16. The router as recited in Claim 15 wherein said protocol data unit receiver subsystem further includes:

an assembler subsystem that receives said at least a portion of said protocol data unit and assembles said protocol data unit; and

a transmit queue subsystem that maintains a linked list

7 associated with said protocol data unit, performs a function on
8 said protocol data unit and maintains at least one queue structure
9 for transmission.

17. The router as recited in Claim 16 wherein said assembler
2 subsystem further stores said at least a portion of said protocol
3 data unit in at least one block and said transmit queue subsystem
4 further maintains a linked list of said at least one block.

18. The router as recited in Claim 15 wherein said virtual
2 segmentation subsystem further includes a stream editor subsystem
3 that performs said virtual segmentation.

19. The router system as recited in Claim 18 wherein said
2 stream editor subsystem further converts between a first protocol
3 and a second protocol.

20. The router as recited in Claim 18 wherein said stream
2 editor subsystem further generates a validity check selected from
3 the group consisting of:

- 4 a cyclic redundancy check (CRC),
- 5 a CRC for asynchronous transfer mode (ATM) adaptive layer 5
6 (AAL5) over ATM, and
- 7 a CRC-10 for operation, administration, maintenance (OAM)

8 cells.

21. The router as recited in Claim 15 wherein said protocol
2 data unit receiver subsystem and said virtual segmentation
3 subsystem further process a plurality of interleaved portions of
4 different protocol data units.